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Old Ties and New Points

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This paper discusses the development and technical transfer of what is perhaps the world's tiniest double ikat, Kasuri, developed in Japan after the Meiji restoration of 1868. Around the early 20th century, Japanese Kasuri was at the zenith of its quality, in creating geometric as well as pictorial designs using a very advanced form of color and weave effect. There were three reasons for this development during this period. The first reason was in the improvement of the "Orijime" technique which is a uniquely Japanese method in making kasuri threads using the loom. The second reason was the importation of knowledge from Lyon, France, on how to use graph paper which greatly contributed to making the designs of the finished textile products more sophisticated and pictorial. The third reason was social in that during this period, there was a rise in the demand for clothing in Japan as the country was becoming modernized. This demand fueled the designers and weavers with the energy to weave better and higher quality textiles in larger quantities.

In this paper, I will explain the significance that western technology had on the development of Japanese Kasuri. I will do this by first chronicling the historical development in the method of making Kasuri textile from the late 19th century and then discuss regarding the great improvements in design that occurred after the use of graph paper.

Before writing about the fully developed sophisticated craftsmanship involved in making silk double Kasuri, I will start by discussing the Kasuri technique called Orijime developed in Kurume, city in Kyushu. Several different tasks are involved in making a Kasuri of which the "Orijime" or "creating resists by tying on the loom" is an important step. The threads used to weave the repeating 2 to 4 mm dot design on the cotton double Kasuri (flourished ca.1880), was produced in large quantities using the Orijime technique (fig.1 and 2).

In the Orijime process the wefts are woven with spaced warps, thus creating highly pressured sections on the weft at certain areas, which later will resist the colors in the dyeing process. It is this weft that will later become both the warp and the weft Kasuri threads for the final textile. The finished Orijime when taken off the loom looks like a woven mat and is dipped in dye. The section in the mat between the spaced warps absorbs the dye. All warp threads are removed after dyeing and the end result is wefts with miniscule white undyed spots that later create the Kasuri design (fig.3).

Now I would like to change my topic and explain about the process of silk Kasuri. Oshima Kasuri made from silk, called Oshima Tsumugi, has been produced on Amami Oshima Island located between Okinawa and Kagoshima, south of the Japanese mainland. The island's location puts it in the Okinawa cultural sphere which affects some of the methods in the creating process. Traditionally, Kasuri in this area was made by hand tying with natural fibers available as resists.

In Oshima, we see two Kasuri threads and two plain ground color threads being alternately woven to create the traditional textile. Around 1905, the Orijime technique also started to be used in this area. In the Orijime process for the Oshima Kasuri 12 to 16 threads of fine silk are bunched together for the wefts by using a glue made from seaweeds. The bonded silk threads are then wound around a flat wooden shuttle to be passed through the shed.

Compared to the Kurume Kasuri, more sophisticated patterns were designed and tied on the Oshima Kasuri. Unlike the monotonous dotted design of those seen in Kurume, the complicated patterns of the silk Kasuri, demanded the exchange of warp threading at each change of design in each row of the textile. Cotton threads were employed as warps. The design on the Oshima Kasuri is made up of a combination of countless numbers of tiny dots and short lines. The most basic dot in the design is created by inserting eight warps through a single dent of the reed (fig.4). The mapping out of the design during this period was done by using symbols on plain paper. When craftsmen started using graph paper it was understood that one marked point on the cross section of a graph paper denoted the most basic dot in a design for a finished double Kasuri and that in the production of the threads eight warps were put through a dent at every third dent. The reed made from bamboo was marked with ink at the dents to facilitate this process. In the present sophisticated Oshima, each line on the graph paper carries ever changing combinations of different patterns (fig.5). In order to realize the sophisticated design on the textile the craftsman making Kasuri threads changes the warp threading following the marks on the drafted design. The threading of the warps is changed for every different design of each row in which the second row is threaded after the first and so on in consecutive order.

When the craftman changes the warp combination on the loom, he adds warps where needed and takes them out where there is no need. The unused warp threads are hung on hooks attached to the wall in front of loom until it is used for a design in the proceeding rows of wefts. The ends of the warps on the threads that are being used are knotted and are laced with a rope which are attached on to nails on the front beam of the loom. This quickens the threading process of the warps and facilitates in the adjustment of the tension of the threads. The work is very efficiently planned but the craftsmen are only able to repeat the rethreading process an average of ten times in a day.

The repeated pattern of the warp Kasuri is kept to the width of the loom in order to make the process efficient (fig.6). Threads with resisted patterns for repeats in the warp direction for several kimonos with the same pattern are produced in one Orijime process. Individual pieces of cloth in the shape of small mats result for each Kasuri warp that is made following marks drafted on each line of a graph paper.

Now I will discuss the process of creating weft Kasuri threads using the Orijime technique. Unlike the individually tied Orijime of the warp Kasuri a weft Kasuri thread, when woven in the final textile has to be one continuous strand with resisted designs for each horizontal row on this single thread (fig.7). Because same patterns are tied at one time, the end results of the Orijime process look like woven bands connected to each other. Unlike warp kasuri, in producing the weft many shuttles are used to raise productivity (fig.8). Each shuttle goes and returns successively to one side since as mentioned before, traditionally Oshima Kasuri has always been composed of two Kasuri threads woven together as one (fig.9). To make two Kasuri wefts continuously, the craftsman runs each flat shuttle twice and returns to the original position (fig.10 and 11).

In the very early 20th century although there were developments in the design, graph paper was still not used in Oshima for designing Kasuri. Designs were made by Orijime craftsman and were originally drawn on a notebook without using graph paper. The accompanying texts explained the design more than the drawing itself. Designs consisting of points and short line combinations continued as a tradition.

A further development in design was started around the Taisho period (1913-25). A design pattern that used single Kasuri threads for both warps and wefts were added during this period to the traditional pattern of always using two Kasuri threads and two ground colored threads in alternating order (fig.12). In this Kasuri pattern, two Kasuri threads alternated with two ground threads, followed by a single Kasuri thread alternating with one ground thread (2-2-1-1 pattern) (fig.13). By the creation of just this one variation, craftsmen were now able to make very complicated designs. Color and weave effects (like the log-cabin weaving pattern) were produced within the plain weave resulting from variations in combination of ground color and resisted white warps and wefts.

To utilize this new design for the final process, the weaver had to use more than two shuttles for the Kasuri wefts. Aged weavers in their 90's today still proudly explain how difficult it was to remember the order of the eight to twelve shuttles they juggled to manage the 2-2-1-1 pattern. The remains of the fragments in this period show these complicated design patterns that were surprisingly woven without drafted patterns on the graph paper.

The designs from the Taisho period were advanced, but it didn't compare anywhere near in its sophistication to the remaining fragments woven in the early Showa period (1927 to 1940). It was in this period that the knowledge of graph paper spread to different Kasuri producers. The Showa designs were pictorial and used patterns consisting of the 2-2-1-1 thread order (fig.14). It would have been impossible to create such a complicated Kasuri pattern without using the graph paper for drafting. By using graph paper, the drafting became more precise, the alternation of two Kasuri, two ground, single kasuri, single ground pattern (2-2-1-1) and so on was consecutively created using the Orijime technique on a continuous thread (fig. 15). The rules of drafting on the graph paper were decided so that the marks landing on the graph lines symbolized two Kasuri threads and those landing on areas "between" the graph lines symbolized a single Kasuri.

Although the use of graph paper brought about precise design, it also prolonged the craftsman's time for producing these long continuous weft Kasuri threads. Instead of running the shuttle thread to go and come back on the loom, all the shuttles were passed through in a single direction, thus producing a long strand of a sash-like cloth (fig.16). In other words two Kasuri wefts were now tied on two consecutive strands before the warp threads were re-threaded to create the next variation for a Kasuri design.

Because of its high quality and extreme labor intensity Oshima Tsumugi was highly valued and expensive. It was soon imitated by other places of Kasuri production in the North which used the technique of Itajime, board clamped dye, which was a more mechanized method of producing resists on the Kasuri. In examining the finished kasuri of different areas it is certain that sophisticated patterns found in extant woven textiles of the Taisho-Showa period must have employed graph paper in the designing process. Moreover, identical recurring designs in different production areas show that design patterns on finished textiles were being recorded and redrafted on graph paper to be transmitted to various manufacturers of Itajime Kasuri. The graph paper technique was

now being used to draft new design as well as to copy the design from the finished textiles of true Oshima Kasuri. The ultimate use of graph paper (for designing purpose or copying purpose) differed according to the area. There were many production sites for board clamped Kasuri in Japan from the late Meiji to the middle of Showa period.

In order to understand the technology transfer, I will now explain the techniques in producing clamp board dyed Kasuri. Clamp boards are made by carving grooves into wooden boards, where the ground color is planned on the textile. The raised plateau of the lines between those grooves can be as thin as 1 mm, which is the width of a point of the double Kasuri. Threads are clamped tightly on to the grooved boards, however threads of warp Kasuri and weft Kasuri are differently placed on boards (fig. 17 and 18). These threads will result in having numerous continuous repeated patterns when dyed.

When being dyed, both the warp and weft Kasuri threads which have been tightly clamped are hung in mid air. The grooved lines are placed vertically when pouring the liquid dye. In a single round of dyeing, large quantities of clearly resisted threads are obtained. The board are reusable for many rounds of the same process.

It was graph paper that made it possible for craftsmen of Itajime Kasuri to copy the design patterns of the expensive Oshima Kasuri using the Orijime technique. Through tracing written historical documents and by comparing samples of extant textile fragments from this period, I have been able to track how the use of graph paper has affected the Kasuri weavers and their art.

It has been documented that Isezaki in northern Kanto, known for the production of Itajime Kasuri in the Late Meiji invited a technician from Kyoto in 1914 to learn the use of graph paper. Kyoto was the most advanced area in weaving technology at the time because the weavers of Nishijin district had brought back the technique and tools for the Jacquard mechanism from Lyon in 1875. Lyon at this time had already a tradition for using graph paper in designing patterns for French ikat called Chine. The weavers in Nishijin were influenced by not only the technique but also the systematic idea which was also later employed for designing kasuri.

Only three years later, in 1917, Isezaki was already able to copy true Oshima Kasuri designs, by using the graph paper technique, which they had learned from Kyoto. Next, in 1918, craftsmen from Musashi Murayama in the outskirts of Tokyo invited a technician from Isezaki to teach them the methods of using graph paper and making grooved boards for Kasuri. In a small museum in Murayama, a complex sample that uses one Kasuri thread in addtion to the traditional 2-2 design pattern is exhibited today. The call number for the sample was No.33 (fig.19). The same number is also found to denote a textile pattern found in Isezaki. It is known that the textile design found in Isezaki was copied from a true Oshima in 1917. I also discovered a fragment of a Taisho period fabric with the exact same design in Oshima as fabric No.33 in Isezaki and Murayama. It is apparent that Oshima who was advanced in design and technique was the originator although they did not yet have the knowledge of graph paper (fig.20). Murayama craftsmen had used the same number "thirty-three" as Isezaki had done to name their first piece made in the Taisho period. The textile sample and the coinciding call number shows that the transfer of designs in the Kasuri patterns were easily carried out between areas of Kasuri production by using graph paper.

The technique of using graph paper was then transferred in 1919 from Isezaki to Amami Oshima where the Orijime technique had been used. It is recorded that Chokichi Takahashi was invited from Isezaki as the teacher. I have interviewed two aged drafters

who learned the technique in the early Showa, from him. They drafters explained that previously, the designing and making of threads were done by the same person but since the profession of drawing the pattern was established through the education of using graph paper, a division of labor has occurred. The quality of the design of Oshima Kasuri advanced in leaps and bounds after 1927. This division of labor as well as the establishiment of The Reseach Institute for Oshima Tsumugi, built in 1927 contributed to the development. The research institute had created many pictorially complicated Kasuri designs using the technique of employing graph paper until 1941 at the start of World War II. The complicated patterns were first drawn in order to create an effect of dimensionality in the designs. In forming patterns only limited variation of colors and limited elements of point and short line combinations were available to the designers. This "lack" forced them to create methods in order to enhance their design vocabulary.

After Amami Oshima itself learned the use of graph paper many outstanding complicated patterns were soon created with ease. The weaver appreciated the continuous Kasuri weft because the use of many shuttles were avoidable. However, the design was easily copied in other kasuri manufacturing areas where graph paper was also used. Kasuri manufacturing areas which used the less expensive Itajime technique were able to easily copy the new designs that were produced in Oshima. The use of graph paper stimulated production in both areas. As design leaders Oshima tried to produce more complicated and sophisticated designs that were difficult to be copied by the others in order to keep their originality. The followers looked for ways to make better and faster copies of the original. This is an example of a penetration of a completely new method of design, brought in from the West that had stimulated the growth of a leading Japanese craft.

(Translated by Naomi Nagano)

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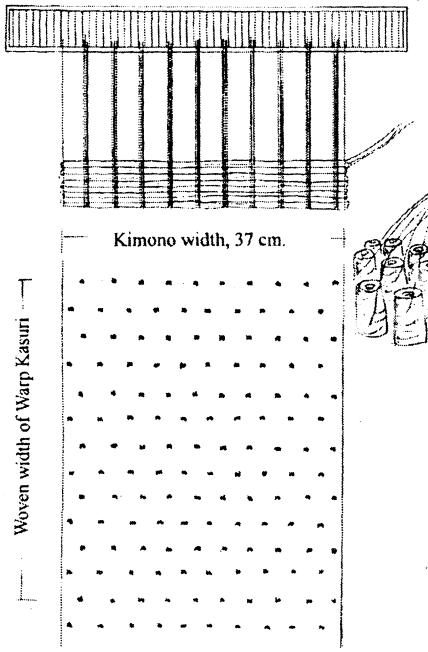
Illustration of Orijime for Dot Designs of Kurume Double Kasuri.

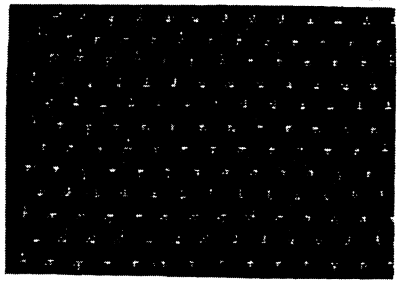
The wefts (a bunch of threads) are woven with spaced warps to create color resisted dot design.

(fig. 1) Weft Kasuri

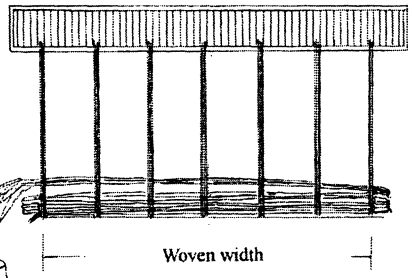


When making the Orijime for the weft Kasuri, the width is that of a width of the kimono.
A bunch of threads is inserted through the warp with a shuttle as in an ordinary weaving process.

Full sized copy

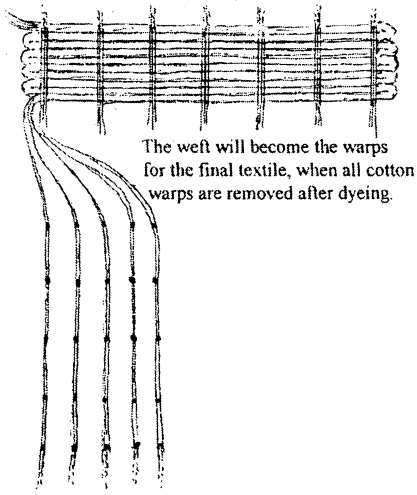


(fig.2) Warp Kasuri



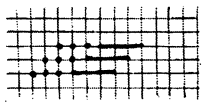
When making the Orijime of the warp Kasuri, the woven width is of any length that is convenient for the craftman. The threads when being tied on the loom are drawn directly from the cones, which are placed on the floor for ease of handling. The bunch of threads goes and returns through the shed in a zigzag movement.

(fig. 3) The finished Orijime looks like a mat.

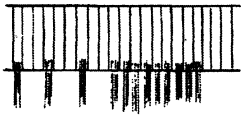


The weft will become the warps for the final textile, when all cotton warps are removed after dyeing.

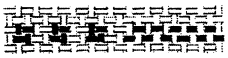
Orijime of Oshima Kasuri



(fig. 4)
Points and lines on graph paper.

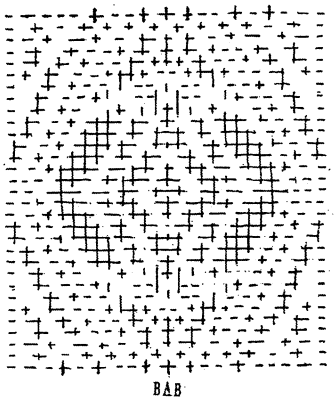


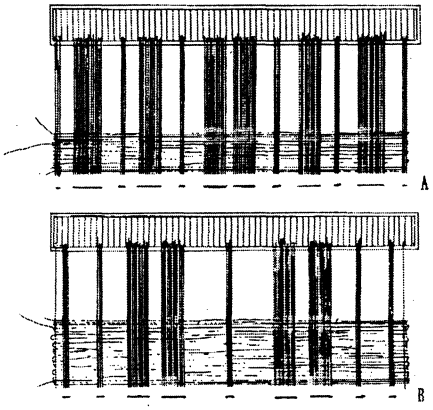
Warp threading on a reed.



Kasuri design.

(fig. 5) Design of Oshima



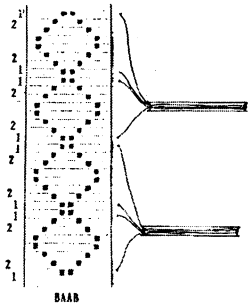


(fig. 6) Warp Kasuri of Oshima
In this discussion we will call this single patterned warp as line A for convenience sake. After the Kasuri warp from line A is woven into mat form, the craftsman secures the finished mat by weaving one more centimeter of textile using cotton threads to treat the end of the cotton warps. The threading is then changed for the next design on graph Line B.
Finished warp Kasuri results like a mat.

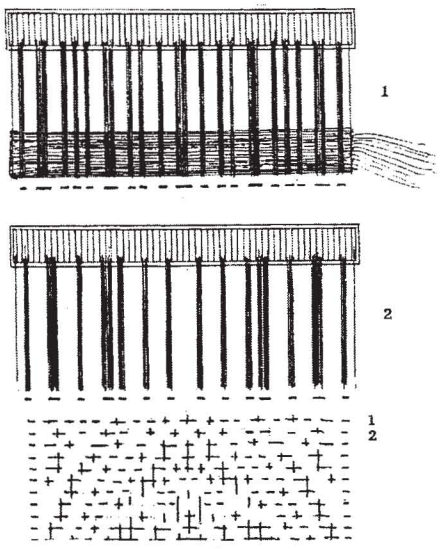
Weft Kasuri

(fig.7) Weft kasuri has to be one continous strand.

(fig. 8) Many shuttles are used for repeated patterns.



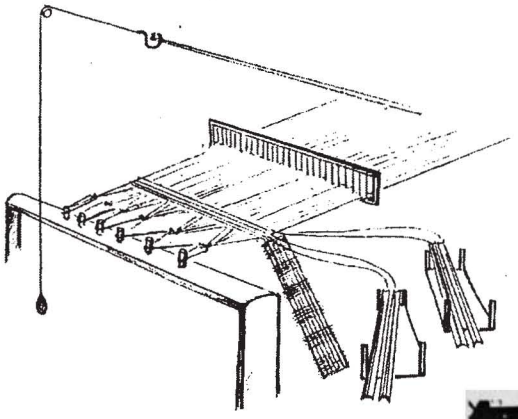
(fig. 9) Weft Kasuri of Oshijma



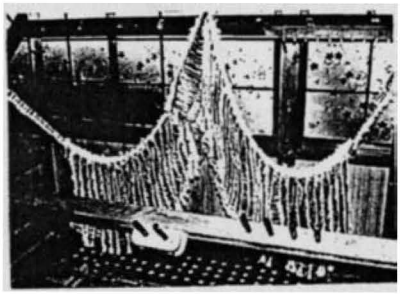
Many shuttles go and return to one side to make two Kasuri threads continuously.

After all the shuttles have returned, the threading of the warps is changed for a different design on row 2, and so on in consecutive order.

As the shuttles return to the selvage, they are stacked consecutively in a box formed from a base and just four poles in each of the corners. When all shuttles have returned to one selvage and into this box, they are turned upside down into another box. The shuttle that was used first comes to the top of the pile again. The process when finished results in making the tied pieces connected and hanging at one side when taken off the loom (fig.11).

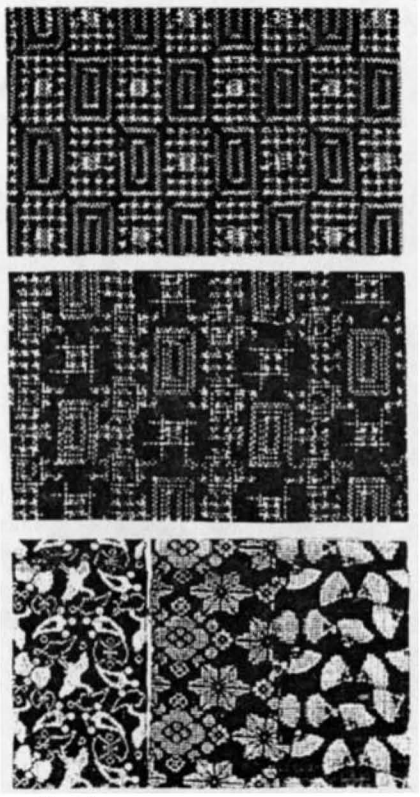


(fig. 10) Unused warps are hung on hooks.
The end of warps are laced with a rope.



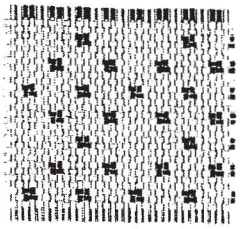
(fig. 11) Connected pieces for 2.2 Kasuri.

Oshima Kasuri in Taisho, before the use of graph paper.

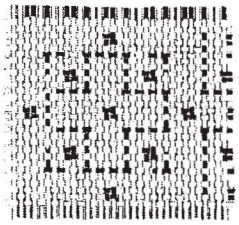


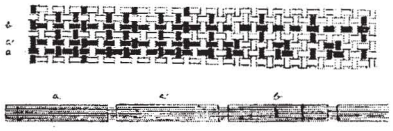
(fig. 14) Three fragments from Showa.

(fig. 12) 2-2 pattern

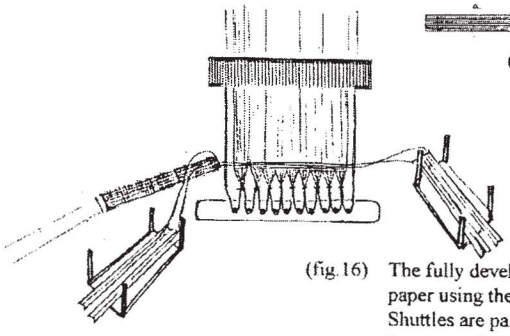


(fig. 13) 2-2-1-1pattern





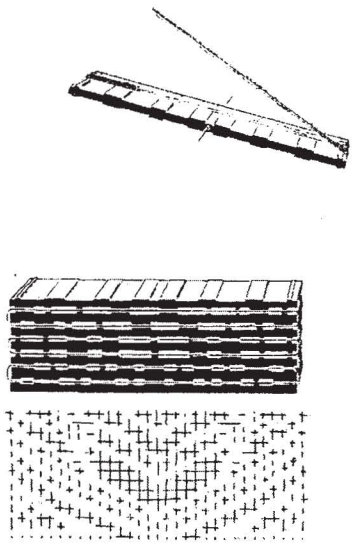
(fig. 15) 2-2-1-1 Kasuri pattern and its continuous Orijime.



(fig.16) The fully developed Kasuri design on graph paper using the 2-2-1-1 Orijime process. Shuttles are passed in a single direction and boxes are placed on both sides to efficiently hold the shuttle in order.

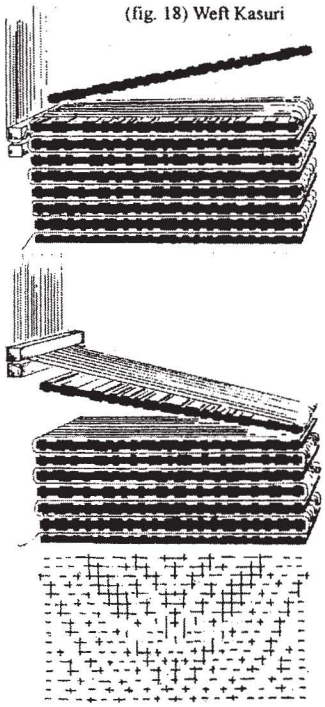
Itajime, clamp board dyed Kasuri

(fig. 17) Warp Kasuri

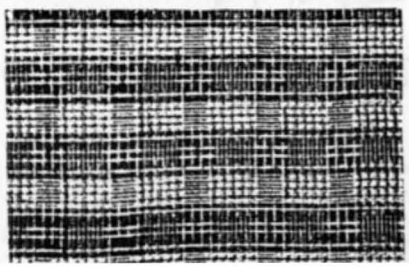


Repeat patterns for the warp Kasuri, are carved on both sides of the clamp board. A bunch of threads are carefully lined and wound around this board. The board is attached to a motor and is rotated to wind the threads evenly and tautly around it. Separate boards are carved as a pair with the same carved patterns on facing sides of the clamp board. These multiple sets of two boards come in stacked fashion when assembled between large clamps to be dyed later.

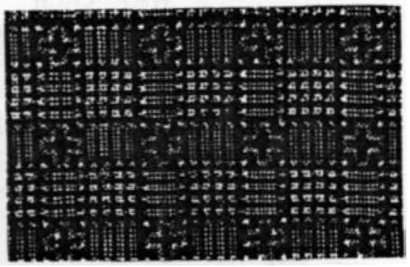
(fig. 18) Weft Kasuri



For the weft Kasuri, identically grooved surfaces of facing boards sandwich the threads. Boards are placed on the horizontal and threads are laid flatly, folding around the boards in a zigzag manner. These threads are held by two rectangular blocks to be clamped tightly between the grooved boards.



(fig. 19) No.33 Itajime Kasuri found in a museum at Murayama.



(fig.20) Oshima in Taisho.